
Brasiliorchis: A New Genus for the *Maxillaria picta* Alliance (Orchidaceae, Maxillariinae)

Rodrigo B. Singer

Departamento de Botânica, Instituto de Biociências, Universidade Federal do Rio Grande do Sul, Av. Bento Gonçalves 9500, Bloco IV, Predio 43432, Sala 207, Bairro Agronomia, CEP 91501-970, Porto Alegre, Rio Grande do Sul, Brazil. rbsinger1@yahoo.com

Samantha Koehler

Departamento de Botânica, Instituto de Biologia, Universidade Estadual de Campinas, Caixa Postal 6109, 13083-970, Campinas, São Paulo, Brazil. samantha.koehler@googlemail.com

Germán Carnevali

Herbarium CICY, Centro de Investigación Científica de Yucatán A. C., Calle 43, No. 130, Col. Chuburná de Hidalgo, 97200 Mérida, Yucatán, México. carneval@cicy.mx

ABSTRACT. *Brasiliorchis* R. Singer, S. Koehler & Carnevali is here proposed to include the orchid species formerly recognized in the *Maxillaria picta* alliance, an orchid group mostly endemic to the Atlantic Rain Forest Biome, in south and southeastern Brazil. The new genus is supported by both morphological features and ongoing molecular studies. The new genus is easily diagnosed by its sulcate to ridged, bifoliate pseudobulbs and its long-lasting, campanulate, rewardless flowers. The pollinaria of these flowers are normally devoid of stipes. Formal diagnosis of the genus and 13 taxonomic combinations are presented: *Brasiliorchis barbozae* (Loefgren) R. Singer, S. Koehler & Carnevali, *B. chrysantha* (Barbosa Rodrigues) R. Singer, S. Koehler & Carnevali, *B. consanguinea* (Klotzsch) R. Singer, S. Koehler & Carnevali, *B. gracilis* (Loddiges) R. Singer, S. Koehler & Carnevali, *B. heismanniana* (Barbosa Rodrigues) R. Singer, S. Koehler & Carnevali, *B. kautskyi* (Pabst) R. Singer, S. Koehler & Carnevali, *B. marginata* (Lindley) R. Singer, S. Koehler & Carnevali, *B. phoenicanthera* (Barbosa Rodrigues) R. Singer, S. Koehler & Carnevali, *B. picta* (Hooker) R. Singer, S. Koehler & Carnevali, *B. polyantha* (Barbosa Rodrigues) R. Singer, S. Koehler & Carnevali, *B. porphyrostele* (Reichenbach f.) R. Singer, S. Koehler & Carnevali, *B. schunkeana* (Campacci & Kautsky) R. Singer, S. Koehler & Carnevali, and *B. ubatubana* (Hoehne) R. Singer, S. Koehler & Carnevali. Lectotypes are designated for *B. barbozae*, *B. chrysantha*, *B. heismanniana*, *B. phoenicanthera*, *B. picta*, and *B. polyantha*. A neotype is proposed for *B. consanguinea*. In addition, a key to distinguish *Brasiliorchis* from other sympatric bifoliate orchids within Brazilian Maxillariinae is presented.

RESUMO. O gênero *Brasiliorchis* R. Singer, S. Koehler & Carnevali, é proposto para conter aquelas espécies de orquídeas antes incluídas na Aliança *Maxillaria picta*; um agrupamento primariamente endêmico do bioma Mata Atlântica, no Sul e Sudeste do Brasil. Este novo gênero é sustentado tanto por caracteres morfológicos quanto por estudos de biologia molecular em andamento. O novo gênero é facilmente diagnosticado pelos seus pseudobulbos bifoliados, sulcados a canaliculados e pelas suas flores campanuladas, duradouras e sem recompensas florais. Os polinários destas espécies normalmente carecem de estipes. Apresenta-se a diagnose formal do novo gênero, bem como treze novas combinações taxonômicas: *Brasiliorchis barbozae* (Loefgren) R. Singer, S. Koehler & Carnevali, *B. chrysantha* (Barbosa Rodrigues) R. Singer, S. Koehler & Carnevali, *B. consanguinea* (Klotzsch) R. Singer, S. Koehler & Carnevali, *B. gracilis* (Loddiges) R. Singer, S. Koehler & Carnevali, *B. heismanniana* (Barbosa Rodrigues) R. Singer, S. Koehler & Carnevali, *B. kautskyi* (Pabst) R. Singer, S. Koehler & Carnevali, *B. marginata* (Lindley) R. Singer, S. Koehler & Carnevali, *B. phoenicanthera* (Barbosa Rodrigues) R. Singer, S. Koehler & Carnevali, *B. picta* (Hooker) R. Singer, S. Koehler & Carnevali, *B. polyantha* (Barbosa Rodrigues) R. Singer, S. Koehler & Carnevali, *B. porphyrostele* (Reichenbach f.) R. Singer, S. Koehler & Carnevali, *B. schunkeana* (Campacci & Kautsky) R. Singer, S. Koehler & Carnevali e *B. ubatubana* (Hoehne) R. Singer, S. Koehler & Carnevali. São propostos lectótipos para *B. barbozae*, *B. chrysantha*, *B. heismanniana*, *B. phoenicanthera*, *B. picta* e *B. polyantha*. Propõe-se um neótipo para *B. consanguinea*.

nea. Além disto apresenta-se uma chave dicotômica para separar *Brasiliorchis* das outras orquídeas Maxillariinae bifoliadas brasileiras.

Key words: *Brasiliorchis*, *Maxillaria*, Maxillariinae, *Maxillaria picta* alliance, morphology, taxonomy.

The subtribe Maxillariinae (Orchidaceae) comprises a well-supported monophyletic assemblage of neotropical species (Whitten et al., 2000). However, generic delimitations within the subtribe are unconvincing and need significant improvement (Dressler, 1993). For that reason, a multidisciplinary task group (<http://128.227.186.212/herbarium/max/people/people.htm>) involving researchers from different countries and institutions was assembled to attempt a solution for this problem. The main goal of this project is to reconstruct a molecular phylogeny for the entire subtribe based on multiple DNA sequence data (M. Whitten, pers. comm.) in order to provide a solid framework to a more robust, phylogenetically acceptable, generic delimitation. Such a reliable phylogeny will allow the re-evaluation of the non-molecular characters that are currently used to distinguish the genera within Maxillariinae. A preliminary molecular cladogram based on the regions ITS 1–2, *matK*, and *atpB-rbcL* spacer, and 320 taxa is already available online (<http://128.227.186.212/herbarium/max/phylogenetics/phylogenetics.htm>). A simplified version of this cladogram is shown in Figure 1, with updated bootstrap values (M. Whitten, pers. comm.).

Some relevant recent findings deserve to be highlighted. The circumscription of the subtribe Maxillariinae was broadened to encompass the former subtribes Lycastiinae and Bifrenariinae (Whitten et al., 2000). Some Maxillariinae subgroups (or alliances, see Pabst & Dungs, 1977) formerly recognized under the large genus *Maxillaria* Ruiz & Pavón have been transferred to other genera on the basis of diagnostic morphological characters (Barros, 2002; Ojeda et al., 2005; Carnevali, in prep.). For example, Barros (2002) transferred most Brazilian species of the distinctive *M. discolor* Reichenbach alliance (sensu Pabst & Dungs, 1977) to the genus *Heterotaxis* Lindley. However, *Heterotaxis* sensu Barros (2002) was paraphyletic (Singer & Koehler, 2003, 2004); this problem was resolved by Ojeda et al. (2005), who expanded *Heterotaxis* to include the species of the *M. valenzuelana* Nash alliance (sensu Pabst & Dungs, 1977) plus other closely related species, thus rendering the genus monophyletic. Other smaller Maxillariinae subgroups related to *Heterotaxis* (sensu Ojeda et al., 2005) and currently placed in *Maxillaria* will soon be also recognized as distinct genera (Ojeda, pers. comm.).

An additional finding from these molecular studies of the Maxillariinae is that, in its former circumscription (Atwood & Mora de Retana, 1999), the genus *Maxillaria* is not monophyletic. Even after the removal of the peripheral species groupings above, it becomes evident from the topology of the most parsimonious cladograms that the genus *Maxillaria* in its former circumscription is grossly polyphyletic or paraphyletic. Several of the traditionally recognized genera in the conduplicate-leaved Maxillariinae (e.g., *Trigonidium* Lindley, *Mormolyca* Fenzl) are nested within the genus *Maxillaria* (Whitten et al., unpublished data; Fig. 1). Thus, a major generic realignment of the Maxillariinae is required.

Preliminary results based on combined, phylogenetic analyses of multiple sequence data for the subtribe Maxillariinae (regions ITS 1–2, *matK*, and *atpB-rbcL* spacer, 320 taxa, see Fig. 1) clearly indicate that species belonging to the *Maxillaria picta* Hooker alliance (sensu Singer & Koehler, 2004) form a well-supported (bootstrap = 100%, Fig. 1), monophyletic assemblage (Singer & Koehler, 2004; M. Whitten, pers. comm.). In addition, this group can be easily recognized by a distinctive set of morphological features, as shown below.

Traditionally, the *Maxillaria picta* assemblage has been considered a subgroup or section within the genus *Maxillaria* (Christenson, 2002; Hoehne, 1953; Pabst & Dungs, 1977; Pfizer, 1889; Senghas, 1996). The *M. picta* alliance falls outside (Fig. 1) the *Maxillaria* core, that subgroup within the Maxillariinae containing the type species of *Maxillaria* (*M. platypetala* Ruiz & Pavón). Instead, the *M. picta* alliance appears more closely related to a mainly Andean clade containing the *M. chartacifolia* Ames & C. Schweinfurth clade, plus the *Cryptocentrum* Benth./*Anthosiphon* Schlechter clade. The *Cryptocentrum*/*Anthosiphon* clade holds species with several floral and vegetative autapomorphies and has no obvious morphological similarity (either in floral or vegetative features) to the *M. picta* alliance. This clade is characterized by unique features such as a conspicuous nectary or spur composed of the sepal's lateral bases and the roof of an extremely elongated column-foot that encloses the backward elongated base of the labellum. Furthermore, the pollinarium is unique in having the stipe reduced to a strap-like, inconspicuous band of tissue, with a short, somewhat amorphous or oblong viscidium. Most species of the *Cryptocentrum*/*Anthosiphon* clade are vegetatively reduced, and all but two species are monopodial. A few species display life history traits of twig-epiphytes (Carnevali, 1996, 2001).

The node that links both clades (the *Maxillaria picta* alliance and the *M. chartacifolia*/*Cryptocentrum*/*Antho-*

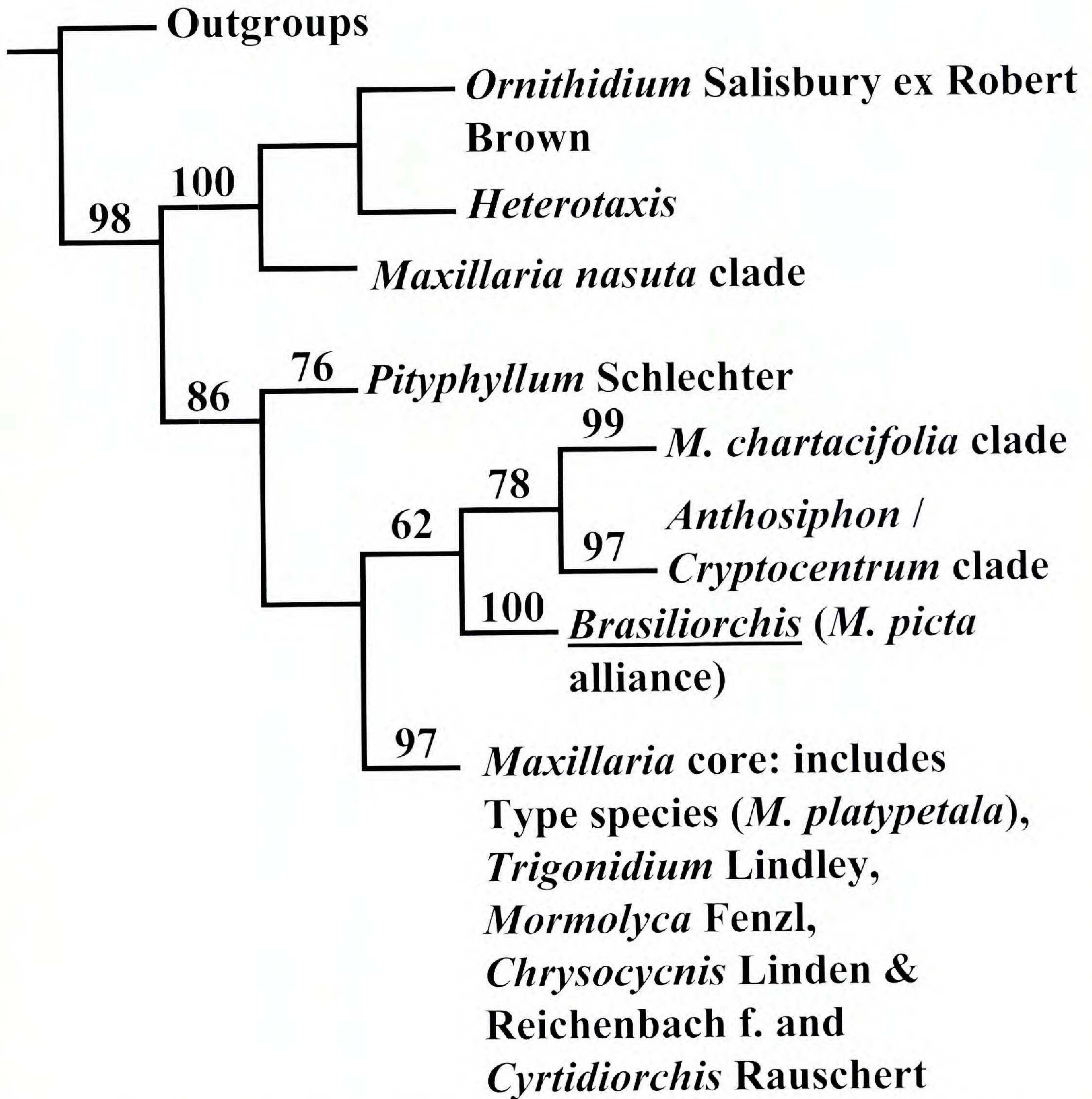


Figure 1. Broad generic relationships in orchid subtribe Maxillariinae. Simplified version of the molecular (ITS 1–2, *mat-K*, *atpB-rbcL* spacer, $n = 320$ taxa) cladogram. Bootstrap values of strongly supported clades are indicated above the branches (Whitten et al., unpublished data). Species of the genera *Bifrenaria* Lindley, *Lycaste* Lindley, and *Eriopsis* Lindley were used as outgroups.

siphon clade) is supported only by moderate to weak bootstrap values (bootstrap = 62%, Fig. 1), thus precluding the merging of all entities into a single genus. These clades are geographically isolated, as well as ecologically and morphologically different. Therefore, the recognition of the *M. picta* alliance as a distinct genus within the subtribe Maxillariinae appears supported by multiple sequence data and a combination of distinctive vegetative and floral features.

Barbosa Rodrigues (1877, 1882) described a total of eight species within this complex (under the genus *Maxillaria*): *M. chrysantha* Barbosa Rodrigues, *M. heismanniana* Barbosa Rodrigues, *M. lilacea* Barbosa

Rodrigues, *M. phoenicanthera* Barbosa Rodrigues, *M. polyantha* Barbosa Rodrigues, *M. rupestris* Barbosa Rodrigues, *M. queirogana* Barbosa Rodrigues, and *M. serotina* Regnell & Barbosa Rodrigues. Four species have already been synonymized: *M. queirogana* and *M. lilacea* have been placed in synonymy with *M. gracilis* Loddiges (Cogniaux, 1904; Sprunger et al., 1996), *M. serotina* has been placed in synonymy with *M. chrysantha* (Cogniaux, 1904; Sprunger et al., 1996), and *M. rupestris* has been placed in synonymy with *M. picta* Hooker (Cogniaux, 1904; Sprunger et al., 1996). We herein accept and follow the aforementioned synonymizations.

Although Barbosa Rodrigues (1877, 1882) validly published the above species, these taxa pose some remarkable problems: (1) type localities are always specified, but no specific type specimens are identified, nor is their repository indicated; (2) these type specimens were possibly deposited at RB (Barbosa Rodrigues was its first curator), but they are clearly lost (see Sprunger et al., 1996); and (3) even when Barbosa Rodrigues (1877, 1882) indicated illustration numbers for each new taxon he described, his actual illustrations remain unpublished to date. It is clear that Barbosa Rodrigues (1877, 1882) intended to publish a complete iconography for his new taxa, without success. The tortuous history of Barbosa Rodrigues' new species is explained in Sprunger et al. (1996), but some details remain obscure. Authors have failed to find any type or potential type candidates (isotypes, paratypes) at RB. In addition, no type candidates have been found at SP.

Cogniaux (1904), with the agreement of Barbosa Rodrigues, published ink drawings based on Barbosa Rodrigues' original artwork. These drawings (Cogniaux, 1904) are the first published illustrations for these taxa. Therefore, in the absence of type specimens, the illustrations published by Cogniaux (1904) are the first choice for lectotypification. More recently, Sprunger et al. (1996) published a volume with copies of Barbosa Rodrigues watercolors made at Kew by Harriet Thiselton Dyer, during 1894–1895. Although these later copies (Sprunger et al., 1996) are colored, the drawings published by Cogniaux (1904) are, in our opinion, equally illustrative. In addition, the work of Cogniaux (1904), as the whole *Flora Brasiliensis*, is now freely available on the Internet (<http://florabrasiliensis.cria.org.br/opus>).

A similarly complex situation is posed by *Maxillaria barbozae* Loefgren. Loefgren (1918) based this species on "plants collected by Campos Porto, in 1908 and 1915, in Itatiaya," without indicating either a type specimen or its repository, although they were possibly deposited at RB. The authors have failed to find these specimens at RB. Because these collections are likely lost and no other type candidates have been found, the original illustration is herein designated as lectotype.

A more complex case is posed by *Maxillaria consanguinea* Klotzsch. This species was described (Klotzsch, 1853) without any indications of type specimens, their putative repository, or collector and almost without data regarding type locality. The putative type specimen or specimens may have been deposited at B, but they are positively lost. Therefore, lacking type specimens or an original illustration that could be designated as lectotype, the designation of a neotype for this taxon seems appropriate.

Brasiliorchis R. Singer, S. Koehler & Carnevali, gen. nov. TYPE: *Brasiliorchis picta* (Hooker) R. Singer, S. Koehler & Carnevali [= *Maxillaria picta* Hooker, Bot. Mag. 59: t. 3154. 1832].

Plantae epiphyticae vel rupicolae, pseudobulbis semper bifoliatis, sulcatis, aggregatis vel separatis. Radices laeves, ferrugineae, brunneae vel albae. Flores fragrantis, campanulati, sine secretionibus. Pollinarium plerumque sine tegula, cum viscidio semilunari, collapsanti. Plerumque plantae sylvicolae ubi in sylvis Brasiliae et Argentinae.

Brasiliorchis is a small (13 species), primarily Brazilian, orchid genus. In Brazil, the distribution of all species overlaps with the Atlantic Rain Forest Biome or Mata Atlântica (Hoehne, 1953; Pabst & Dungs, 1977), from Rio Grande do Sul (Waechter, 1998) to Bahia (Toscano de Brito & Cribb, 2005). Only three species extend their ranges beyond Brazil: *B. picta* (Hooker) R. Singer, S. Koehler & Carnevali and *B. chrysantha* (Barbosa Rodrigues) R. Singer, S. Koehler & Carnevali reach extreme northeastern Argentina, in Misiones (Correa, 1996; Johnson, 2001), and *B. marginata* (Lindley) R. Singer, S. Koehler & Carnevali has been reported in Ecuador (Toscano de Brito & Cribb, 2005). Two species (*B. kautskyi* (Pabst) R. Singer, S. Koehler & Carnevali and *B. schunkeana* (Campacci & Kautsky) R. Singer, S. Koehler & Carnevali) are endemic to the Brazilian state of Espírito Santo (Singer & Koehler, 2004). The genus can be identified easily in the field through a set of consistent morphological features. The pseudobulbs are always bifoliate and ridged to sulcate (Fig. 2A). The leaves are conduplicate and strap-like, longer in individuals growing in shady places and stiffer, shorter, and yellowish green in plants growing in sunnier conditions. As an exception, *B. kautskyi* displays acicular leaves. The roots are smooth and reddish or brownish to white in color. The flowers are campanulate (Fig. 2B, C), showy and long-lasting (10 days or more), fragrant, and devoid of secretions or pluricellular trichomes. The floral pedicel is normally well developed. The column is almost straight and lacks lateral appendages (column wings) (Fig. 2D), while the column foot is not as well developed as in other members of the Maxillariinae. The anther is incumbent and umbonate, holding a pollinarium made up by two subequal pairs of dorsally compressed, yolk-yellow pollinia (Fig. 2F). In most species, the pollinarium lacks tegular stipe and displays a soft, hyaline, semilunar viscidium that readily collapses after pollinarium removal (Singer & Koehler, 2003, 2004). Most species present tightly aggregated pseudobulbs. In a few species (*B. marginata*, *B. chrysantha*), the pseudobulbs are separated by a conspicuous rhizome that is covered by dry bracts. The flowers of most

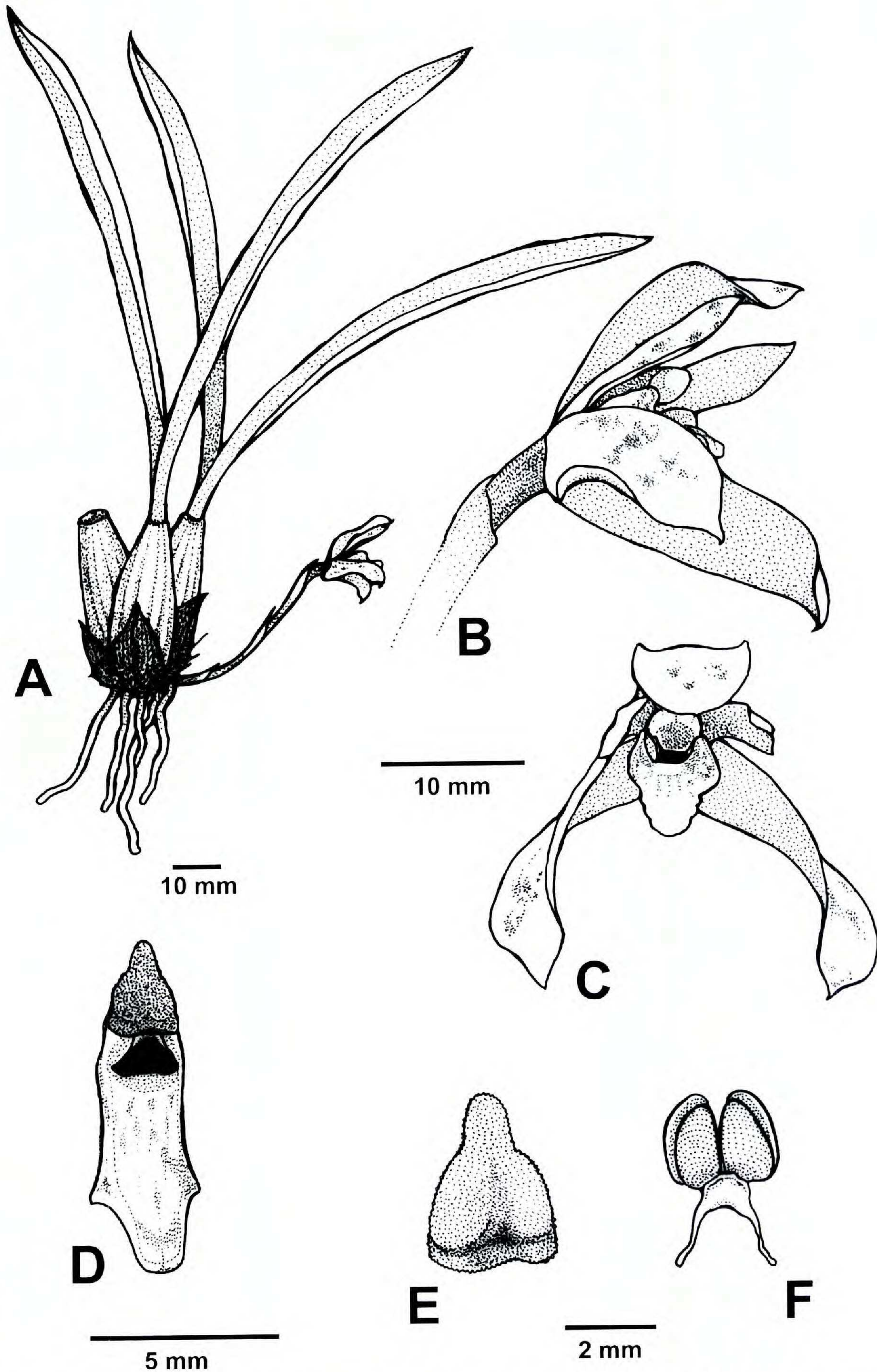


Figure 2. *Brasiliorchis picta* (Hooker) R. Singer, S. Koehler & Carnevali. —A. Habit. Notice the bifoliate, conic pseudobulbs. —B, C. Flower. B. Lateral view. C. Frontal view. —D. Column. —E. Anther cap. —F. Pollinarium. Based on: Pedra Grande, Atibaia, São Paulo, 11 Aug. 2003, R. B. Singer, R. Farias-Singer & S. Gomes s.n. (ICN 144787).

species combine cream or yellowish cream colorations with purple dots or maculation. The flowers of the small-sized *B. barbozae* (Loefgren) R. Singer, S. Koehler & Carnevali and *B. schunkeana* are excep-

tional within the genus in displaying a dark, shining labellum, similar to those of the *Maxillaria* species belonging to the *M. madida* Lindley alliance (Pabst & Dungs, 1977) or to the species related to *M. nasuta*

Reichenbach f. The few chromosome counts available for the group (of *B. picta*) are of $2n = 40$ (Blumenschein, 1960; Carnevali, 1991).

Etymology. From “Brasilia” (Brazil) and “orchis” (orchid, Orchidaceae). The name emphasizes that this is essentially a Brazilian orchid genus.

NEW COMBINATIONS

1. *Brasiliorchis barbozae* (Loefgren) R. Singer, S. Koehler & Carnevali, comb. nov. Basionym: *Maxillaria barbozae* Loefgren, Arch. Jard. Bot. Rio de Janeiro 2: 60, 1918. TYPE: Brazil, Rio de Janeiro: Itatiaia (lectotype, designated here, tab. XXV, in Loefgren, 1918). EPITYPE: Brazil, Rio de Janeiro: Itatiaia, Maromba, 22 May 1935, A. C. Brade 14630 (epitype, designated here, RB).

Loefgren (1918) based his new species on specimens prepared from “plants collected by Campos Porto, in 1908 and 1915, in Itatiaia,” without indicating a type collection or its repository, although they were possibly deposited at RB. These collections are likely lost, and the original illustration is herein designated as lectotype. Because the original illustration is a bit schematic regarding pseudobulb and flower features, we propose an epitype (A. C. Brade 14630, RB), which comes from the type locality and, in our opinion, is fully representative of this species.

2. *Brasiliorchis chrysantha* (Barbosa Rodrigues) R. Singer, S. Koehler & Carnevali, comb. nov. Basionym: *Maxillaria chrysantha* Barbosa Rodrigues, Gen. Sp. Orchid. 1: 115, 1877. TYPE: Brazil, Sapucahy (lectotype, designated here, tab. 5 in Cogniaux, 1904: 46–47).

Barbosa Rodrigues (1877) validly published *Maxillaria chrysantha*, but his illustration for this taxon remained unpublished until Cogniaux (1904) published an ink drawing based on Barbosa Rodrigues’ original artwork. This plate constitutes the first published illustration of this species, and we herein designate it as lectotype because no extant type specimens are known to the authors.

3. *Brasiliorchis consanguinea* (Klotzsch) R. Singer, S. Koehler & Carnevali, comb. nov. Basionym: *Maxillaria consanguinea* Klotzsch, Ann. Sci. Nat., Bot. sér. III, 19: 376, 1853. TYPE: Brazil, Rio de Janeiro: Nova Friburgo, Morro da Caledonia, 7 Mar. 1937, E. Amarante s.n. (neotype, designated here, RB).

Maxillaria consanguinea Klotzsch, var. *major* Hoehne, Arq. Bot. Estado São Paulo, n.s. 2(6): 128, 1952. Syn. nov. TYPE: Brazil, sine loc., 14 June 1930, F. C. Hoehne s.n. (holotype, SP) [cultivated at the Jardim Botânico, São Paulo].

Maxillaria consanguinea Klotzsch, f. *pallida* Hoehne, Icon. Orchid. Bras., tab. 229, 1949. Syn. nov. TYPE: Brazil, São Paulo, Ipanema, 27 Dec. 1932, F. C. Hoehne s.n. (holotype, SP).

Maxillaria piresiana Hoehne, Arq. Bot. Estado São Paulo, n.s. 2(6): 128, 1952. Syn. nov. TYPE: Brazil, São Paulo, 1898, G. Edwall CGG 3879 (lectotype, designated here, SP).

The type collection and any other possible type candidates for *Brasiliorchis consanguinea* are apparently lost. In addition, the original description lacks an illustration that could be designated as lectotype. Therefore, we herein propose a neotype for *B. consanguinea* that, in our opinion, is fully representative of this taxon. Hoehne (1953: 285) examined this specimen for his *Flora Brasílica* and indicated its similarity with the type description. This specimen is complete regarding flower and vegetative features.

During the examination of the syntypes of *Maxillaria piresiana* (A. Gehrt s.n., SP; F. C. Hoehne & M. Kuhlmann s.n., SP; G. Edwall CCG 3879, SP), we concluded that they only represent continuous phenotypical variations of *Brasiliorchis consanguinea*. The affinity between these two taxa was already noticed by Hoehne (1953). Given the great morphological resemblance between these taxa, we place *M. piresiana* in synonymy with *B. consanguinea*. The specimen G. Edwall 3879 (SP) seems complete and fully representative of this taxon and is herein designated as lectotype.

4. *Brasiliorchis gracilis* (Loddiges) R. Singer, S. Koehler & Carnevali, comb. nov. Basionym: *Maxillaria gracilis* Loddiges, Bot. Cab. 19: tab. 1837, 1832. TYPE: [Brazil.] sine loc., sine coll. (holotype, K).

5. *Brasiliorchis heismanniana* (Barbosa Rodrigues) R. Singer, S. Koehler & Carnevali, comb. nov. Basionym: *Maxillaria heismanniana* Barbosa Rodrigues, Gen. Sp. Orchid. 2: 201, 1882. TYPE: Brazil, Rio de Janeiro: Rodeio (lectotype, designated here, tab. 8(II) in Cogniaux, 1904: 38–39).

Barbosa Rodrigues (1882) validly published *Maxillaria heismanniana*, but his illustration for this taxon remained unpublished until Cogniaux (1904) published an ink drawing based on Barbosa Rodrigues’ original artwork. This plate constitutes the first published illustration of this species, and we therefore designate it as lectotype because no extant type specimens are known to the authors.

6. *Brasiliorchis kautskyi* (Pabst) R. Singer, S. Koehler & Carnevali, comb. nov. Basionym: *Maxillaria kautskyi* Pabst, *Bradea* 1(20): 181. 1972. TYPE: Brazil. Espírito Santo: prox. Domingos Martins, 25 July 1965, R. Kautsky 100 (holotype, HB; isotype, K).

7. *Brasiliorchis marginata* (Lindley) R. Singer, S. Koehler & Carnevali, comb. nov. Basionym: *Cymbidium marginatum* Lindley, *Bot. Reg.* 18: tab. 1530. 1833. *Maxillaria marginata* (Lindley) Fenzl, *Fl. des Serres*, ser. 1(10): 112. 1854 [1855]. TYPE: Brazil. Rio de Janeiro, s.d., s. coll. (holotype, K).

Maxillaria murilliana Hoehne, *Arq. Bot. Estado São Paulo*, n.s. 2: 130. 1952. Syn. nov. TYPE: Brazil. São Paulo: Sorocaba, s.d., O. Derby CGG 6053 (holotype, SP).

The analysis of the holotype of *Maxillaria murilliana* deposited at SP convinced us that this taxon only represents a morphological variation of *Brasiliorchis marginata*. The similarity between these taxa was already noticed by Hoehne (1953). Therefore, we place this taxon under the synonymy of *B. marginata*.

8. *Brasiliorchis phoenicanthera* (Barbosa Rodrigues) R. Singer, S. Koehler & Carnevali, comb. nov. Basionym: *Maxillaria phoenicanthera* Barbosa Rodrigues, *Gen. Sp. Orchid.* 2: 200, tab. 659. 1882. TYPE: Brazil. Rio de Janeiro: Rodeio (lectotype, designated here, tab. 9(III) in Cogniaux, 1904: 45).

Barbosa Rodrigues (1882) validly published *Maxillaria phoenicanthera*, but his illustration for this taxon remained unpublished until Cogniaux (1904) published an ink drawing based on Barbosa Rodrigues' original artwork. This plate constitutes the first published illustration of this species, and we therefore designate it as lectotype because no extant type specimens are known to the authors.

9. *Brasiliorchis picta* (Hooker) R. Singer, S. Koehler & Carnevali, comb. nov. Basionym: *Maxillaria picta* Hooker, *Bot. Mag.* 59: tab. 3154. 1832. TYPE: Brazil. Rio de Janeiro: Organ Mtns. (lectotype, designated here, tab. 3154 in Hooker, 1832).

This plate is based on a plant sent to England from the Organ Mountains, in the state of Rio de Janeiro, Brazil. There is no type specimen deposited at K; therefore, we herein designate the original illustration as the lectotype.

10. *Brasiliorchis polyantha* (Barbosa Rodrigues) R. Singer, S. Koehler & Carnevali, comb. nov.

Basionym: *Maxillaria polyantha* Barbosa Rodrigues, *Gen. Sp. Orchid.* 2: 202. 1882. TYPE: Brazil. Rio de Janeiro: Serra do Mar (lectotype, designated here, tab. 9(II) in Cogniaux, 1904: 37–38).

Barbosa Rodrigues (1882) validly published *Maxillaria polyantha*, but his illustration for this taxon remained unpublished until Cogniaux (1904) published an ink drawing based on Barbosa Rodrigues' original artwork. This plate constitutes the first published illustration for this species, and we therefore designate it as lectotype because extant type specimens are unknown to the authors.

11. *Brasiliorchis porphyrostele* (Reichenbach f.) R. Singer, S. Koehler & Carnevali, comb. nov. Basionym: *Maxillaria porphyrostele* Reichenbach f., *Gard. Chron.* 1: 978. 1873. TYPE: Brazil. Rio Grande do Sul, [Feb. 1873], *Mr. Bull s.n.* (holotype, K).

12. *Brasiliorchis schunkeana* (Campacci & Kautsky) R. Singer, S. Koehler & Carnevali, comb. nov. Basionym: *Maxillaria schunkeana* Campacci & Kautsky, *Orquidário* 7(4): 136. 1993. TYPE: Brazil. Santa Leopoldina, Espírito Santo, Sept. 1990, V. Schunk s.n. (holotype, SP).

13. *Brasiliorchis ubatubana* (Hoehne) R. Singer, S. Koehler & Carnevali, comb. nov. Basionym: *Maxillaria ubatubana* Hoehne, *Arq. Bot. Estado São Paulo* n.s. 2(4): 88. 1947. TYPE: Brazil. São Paulo: Alto da Serra de Ubatuba, May 1946, F. C. Hoehne s.n. (holotype, SP).

SEPARATING *BRASILIORCHIS* FROM OTHER SYMPATRIC BIFOLIATE MAXILLARIINAE ORCHIDS

A number of Brazilian Maxillariinae orchids sympatric with *Brasiliorchis* also present bifoliate pseudobulbs. When these taxa are in bloom, identification is unequivocal, but as can be seen in the following artificial key, all these orchids groups can be set apart mostly through the use of vegetative characters.

ARTIFICIAL KEY TO SEPARATE *BRASILIORCHIS* FROM OTHER SYMPATRIC, BIFOLIATE BRAZILIAN MAXILLARIINAE ORCHIDS

- 1a. Leaves conduplicate or acicular, flowers solitary . . . 2
- 1b. Leaves plicate, inflorescences pluriflorous
. . . *Xylobium squalens* (Lindley) Lindley and related taxa
- 2a. Roots smooth, variously coloured. 3
- 2b. Roots with ring-like constrictions, whitish
Maxillaria madida Lindley and related taxa (some forms)
- 3a. Pseudobulbs ridged or sulcate, conic, rhizome between pseudobulbs short or conspicuous *Brasiliorchis*
- 3b. Pseudobulbs smooth, laterally flattened, elliptic, roundish or conic 4

- 4a. Pseudobulbs aggregated. 5
 4b. Pseudobulbs separated by a conspicuous rhizome, covered by bracts 6
 5a. Pseudobulbs roundish to elliptic, flowers erect, trigonous
 *Trigonidium obtusum* Lindley and related taxa
 5b. Pseudobulbs conic or claviform, flowers campanulate, with resin-like secretions at labellum surface
 *Maxillaria scorpioidea* Kraenzlin (Obs.; there are, in addition, trifoliate plants or pseudobulbs) covering the rhizome normally dry and brown.
 6a. Pseudobulbs small, up to 2 cm in length, bracts with long pedicels, with whitish wax-like secretion at labellum surface
 Maxillaria cerifera Barbosa Rodrigues and related taxa
 6b. Pseudobulbs bigger than 2 cm in length, flowers with short pedicels 7
 7a. Bracts covering the rhizome normally alive and green. Flowers with a tuft of clavate trichomes at labellum surface . . . *Maxillaria camaridii* Reichenbach f.
 7b. Bracts covering the rhizome normally dry and brown. Flowers with a glabrous, shiny labellum. *Maxillaria johannis* Pabst

NATURAL HISTORY

Brasiliorchis plants are quite tolerant regarding light and soil conditions, a fact that renders them phenotypically variable. Plants may either occur as epiphytes or lithophytes. Plants in shady habitats tend to develop longer, broader and darker leaves. Conversely, plants in sunnier places tend to develop smaller, yellowish leaves. The flowers of most species are fragrant (Flach et al., 2003) and devoid of any reward to the pollinators (Singer & Cocucci, 1999; Singer & Koehler, 2003, 2004; Singer, 2003). Meliponini bees of the genus *Trigona* and some wasps of the Vespidae family have been recorded as pollinators (Singer & Cocucci, 1999; Singer & Koehler, 2004; Singer, 2003). Because the flowers are rewardless, floral visits are likely restricted to the very first days after blooming. With the exception of *B. chrysantha*, all *Brasiliorchis* species whose breeding system could be studied have been shown to be strongly self-incompatible (self-pollinated flowers abort) (Singer, unpublished). Some species, such as *B. picta*, *B. porphyrostele*, and *B. chrysantha*, are widely cultivated and have ornamental, long-lasting flowers. To date, there are no clear indications that any species within the genus are at risk of extinction. Perhaps this could be the case for *B. schunkeana* and *B. kautskyi*, two small species endemic to Espírito Santo, a Brazilian State that has almost eradicated its forests. However, conclusive evidence is lacking.

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